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AMERICAN CHEMICAL SOCIETY.

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MAY.

1884.

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1884.

The **Journal of the American Chemical Society** appears monthly, except during July and August. It will contain all papers read before the Society, as well as abstracts from American and Foreign Journals, and a list of American Patents relating to Chemical Industries.

The Price of Subscription is $5.00 per year, in advance.

The Meeting Room and Library of the Society are at Room 1, University Building, Washington Square, New York.

The Regular Monthly Meeting is held on the first Friday of every month, at 8 P. M. A *Conversazione* is held on the third Friday of every month, at the same hour.

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The Library is open to Members at any time on presenting to the Janitor of the University Building a ticket, which can be obtained of the Librarian.

W. RUPP, 117 Pearl St., New York.

The Committee on Papers and Publications respectfully call attention to the resolutions of the Society, requiring that papers be submitted to the Committee before being read.

Members who cannot be present at the meetings, are requested to send their papers in care of the Committee, who can guarantee prompt publication of all articles accepted.

Authors will be furnished, gratis, with 20 reprints of each article published in the Journal, if application for the same be made when the article is sent.

Members are requested to notify the Committee of any change of address, or failure in the delivery of the Journal. All communications relating to the Journal should be addressed in care of

A. A. BRENEMAN, 97 Water St., New York.

PROCEEDINGS OF THE AMERICAN CHEMICAL SOCIETY.

Regular Meeting, Friday May 2d, 1884.

Vice-President Leeds in the Chair.

The minutes of the April meeting were read and approved.

The Librarian read a list of additions to the library, and letters with regard to exchanges.

The following gentlemen were proposed for membership:

Richard Linke, 345 East 18th street, New York City, proposed by James H. Stebbins Jr., Wm. Rupp, Albert R. Leeds.

Arthur L. Greene, Ann Arbor, Mich., proposed by A. R. Prescott, P. Casamajor, H. Endemann.

Dr. H. M. Baker, 87 Ross street, Brooklyn, N. Y., proposed by P. Casamajor, H. Endemann, M. Alsberg.

As an associate member, Charles A. Heinitsh, Lancaster, Pa., proposed by A. A. Breneman, A. R. Leeds, W. Rupp.

The following papers were then read:

1st. On the Spectra of Azo-Colors, (2d paper) by J. H. Stebbins, Jr.

Discussion by Messrs. Doremus, Breneman, Stebbins, Endemann and the Chair.

2d. On the action of Diazo-β-naphthaline chloride on Phenols, by J. H. Stebbins, Jr.

Discussion by Messrs. Waldstein, Casamajor and Endemann.

3d. On β Phenanthrolmonosulpho-acid, by Wm. Rupp.

Discussion by Messrs. Stebbins and Rupp.

The meeting then adjourned.

C. E. Munsell,
Recording Secretary.

ADDITIONS TO THE LIBRARY OF THE AMERICAN CHEMICAL SOCIETY.

DURING APRIL, 1884.

Presented by Prof. A. R. Leeds :

A. Naquet. "Principes de Chimie Fondeé sur les Theories Modernes."

A. Herlant. "Precis du Course de Chimie Usuelle."

S. Clegg, Jr. "A Practical Treatise on the Manufacture and Distribution of Coal Gas."

Presented by the American Institute of Mining Engineers:

A. Springer. "The Torsion Balance" (pamphlet).

M. Troilius. "Tables for Facilitating the Heat Calculations of Furnace Gases Containing CO_2, CO, CH_4, H and N" (pamphlet).

M. Troilius. "Sulphur Determination in Steel" (pamphlet).

P. G. Salom. "Physical and Chemical Tests of Steel for Boiler- and Steel-Plate for the United States Government Cruisers" (pamphlet).

J. T. Kimball. "The Quemahoning Coal Field of Somerset County, Pa." (pamphlet).

F. Firmstone. "Tamping Drill Holes with Plaster of Paris" (pamphlet).

F. Firmstone. "Note Concerning Certain Incrustations on Pig Iron" (pamphlet).

N. W. Lord. "Note on the Presence of Lithia in Ohio Fire Clays" (pamphlet).

N. W. Lord. "Note on Some Highly Phosphuretted Pig Irons" (pamphlet).

E. Gridley. "Notes Concerning a Grade of Iron Made from Carbonate Ore" (pamphlet).

F. Julian. "Note on the Determination of Phosphorus in Iron" (pamphlet).

W. B. Devereux. "Notes on Iron Ore Deposits in Pitkin County, Colorado" (pamphlet).

From the Bureau of Education, Washington, D. C.:

"Circular of Information, No. 1, 1884. Meeting of the International Prison Congress at Rome, in October, 1883."

"Circular of Information, No. 5, 1873. Account of College Commencements During 1873 in the Western and Southern States."

"Report of the Director of the American School of Classical Studies at Athens for the Year 1882–83."

From the Massachusetts State Agricultural Experiment Station:

Bulletin No. 8, April, 1884.

"Fodder and Fodder Analyses" (pamphlet).

ON THE SPECTRA OF AZO-COLORS.

(Second Paper.)

By J. H. Stebbins, Jr.

In the last paper on this subject I described a series of dyestuffs, which differ from one another not only chemically but also, to quite an extent spectroscopically, if I may use the term.

It will also be remembered that they produced no characteristic absorption bands, but merely a cutting out of the green, blue and violet parts of the solar spectrum. This cutting out of the spectrum was more or less pronounced according to the nature and strength of the solutions.

The few remaining dyestuffs of this series, which I have now to describe, possess these properties likewise but to a much less extent than the former ones.

I have also made quantitative tests with the view of determining how small an amount of coloring matter can be estimated by this means.

Ponceau R. R.

Pseudocumol-azo-β-naphtholdisulpho-acid

$$C_6H_2\begin{cases}(CH_3)_3\\ N{=}N{-}\beta{-}C_{10}H_4(HSO_3)_2OH.\end{cases}$$

Dissolved ¼ grm. in 1 litre of water and examined the spectrum. It gave a band extending from C. 48—H. 170.

Region of greatest absorption is D. 52—H. 170.

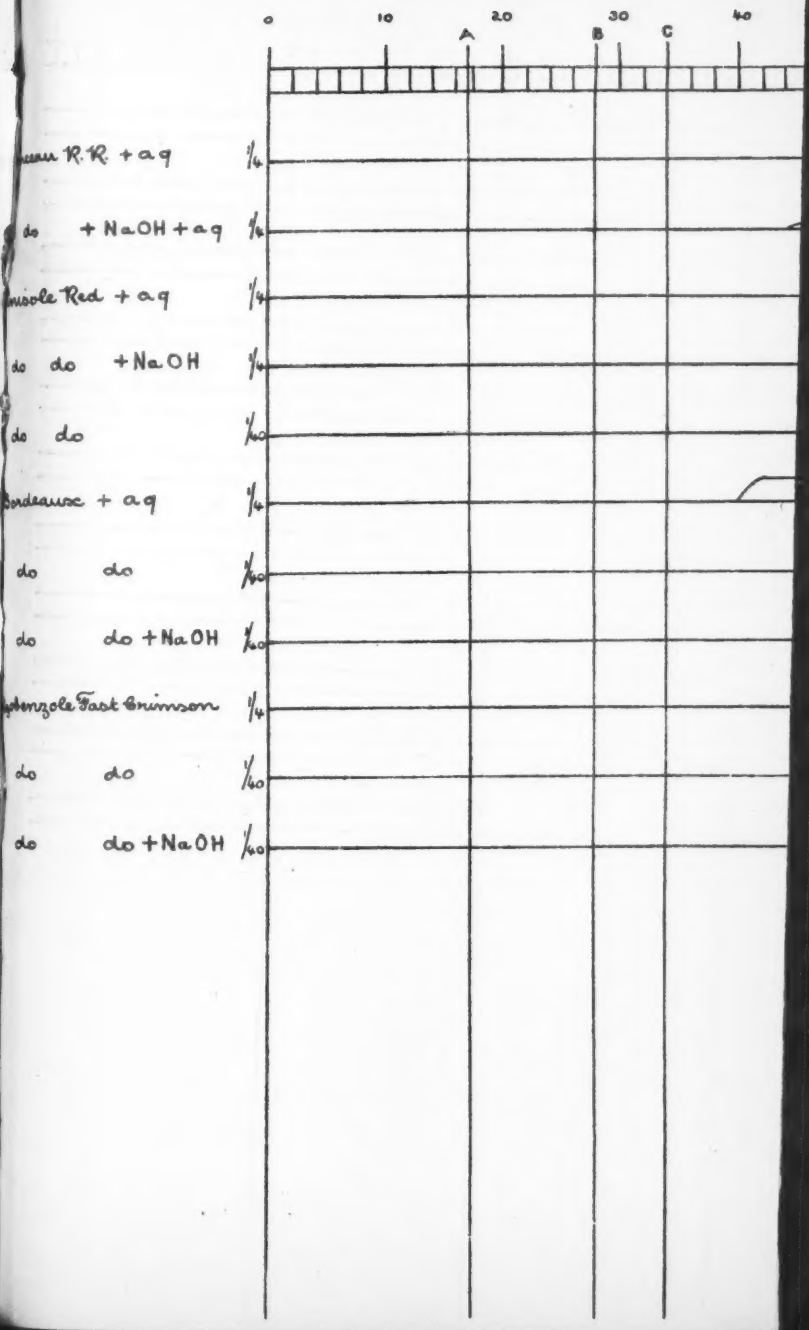
The same on being treated with caustic soda produced a spectrum extending from C. 42—H. 170. Region of maximum absorption D. 51—H. 170. This dyestuff, as will be seen, (Plate II) cuts out all the green, blue and violet parts of the solar spectrum. The absorption band is still plainly visible with a dilution of 1 pt. in 40,000.

Anisole Red.

Anisol-azo-β-naphtholmonosulpho-acid

$$C_6H_4\begin{cases}OCH_3\\ N{=}N{-}\beta{-}C_{10}H_5(HSO_3)OH.\end{cases}$$

Dissolved ¼ grm. in 1 litre of water and observed the spectrum. The absorption band extends from C. 47 —H. 170.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20
30
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A
B
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Red + aq
do do + NaOH
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Fast Crimson
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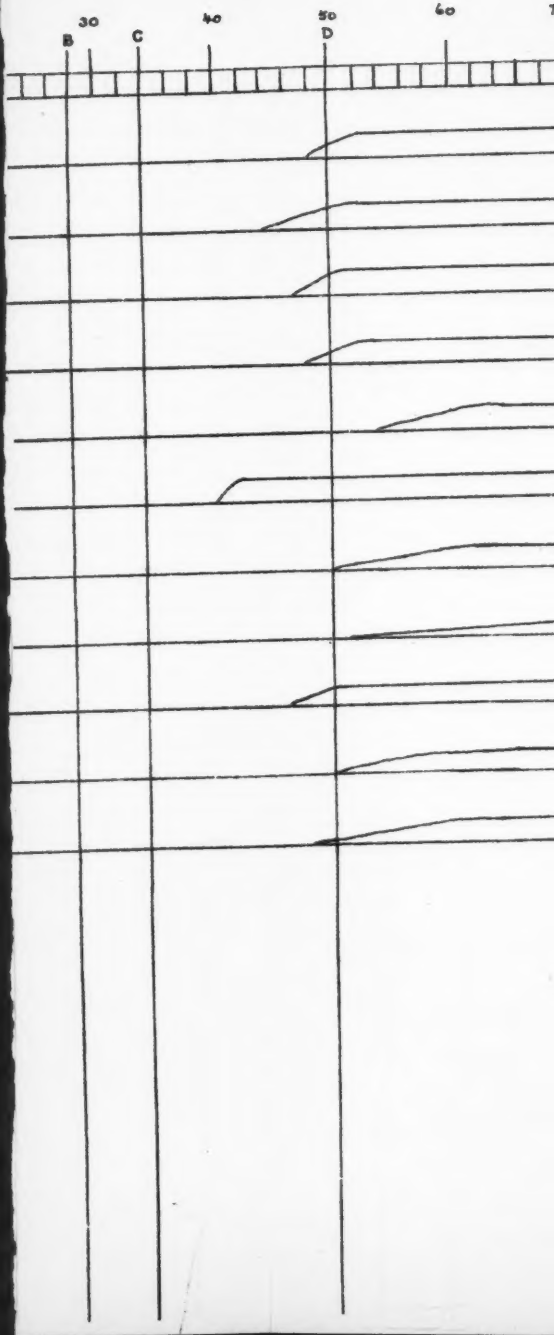
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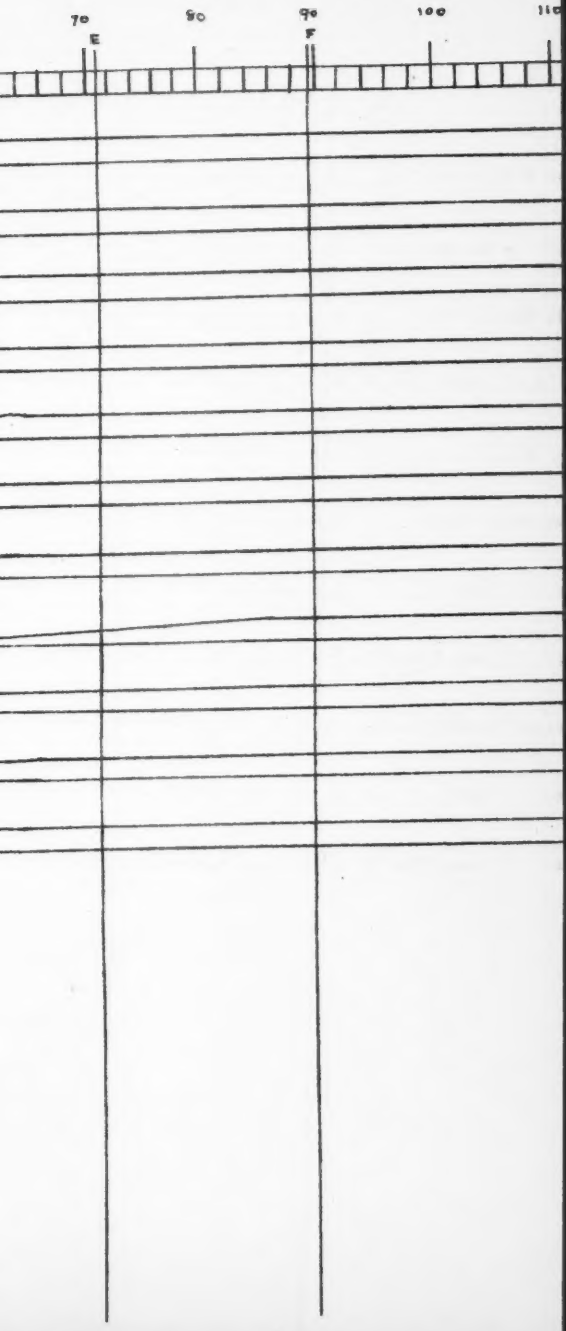
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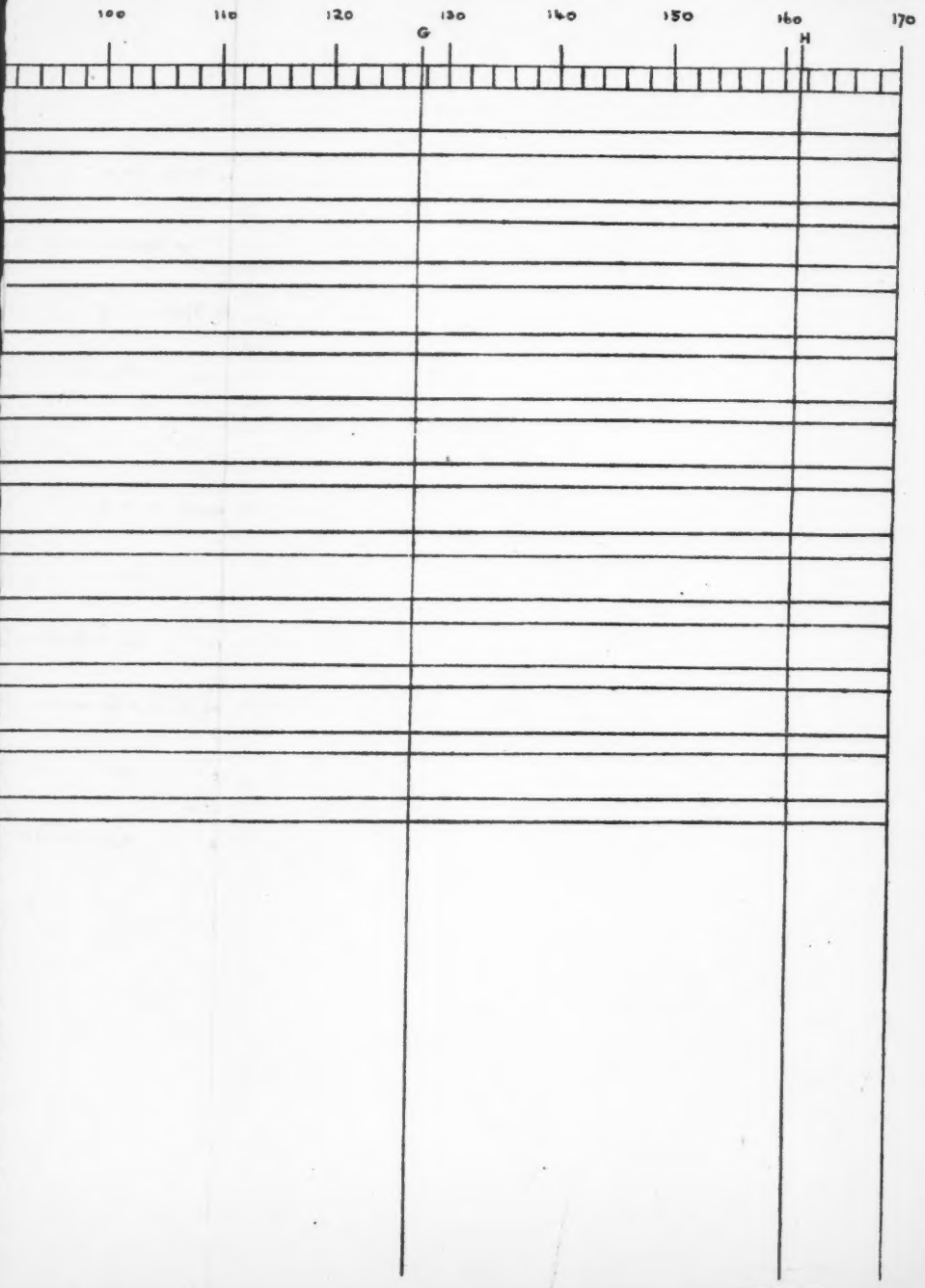
Plate II



Region of maximum absorption D. 52—H. 170.

The same on being treated with caustic soda produces but a very slight variation in the position of the absorption band. It extends from C. 48—H. 170. Region of greatest absorption D. 54—H. 170.

The same diluted to 1 pt. in 40,000, still shows the band very plainly, only in this case it cuts out less of the green.

Its position extends from D. 54—H. 170.

Region of greatest absortion D. 64—170.

A dilution of 1 pt. in 400,000 no longer produces an absorption, but still plainly shows a faint coloration.

Bordeaux.

Naphthalene-azo-β-naphtholdisulpho-acid

$C_{10}H_7—N=N—\beta\text{-}C_{10}H_4(SO_3H)_2OH.$

Dissolved $\frac{1}{4}$ grm. in 1 litre of water and examined the absorption band. In this case the band extends from C. 40—H. 170. Region of greatest absorption C. 42—H. 170. The same diluted to 1 pt. in 40,000, shows a band extending from D. 50—H. 170. Region of greatest absorption D. 68—H. 170. The same, plus caustic soda, gave a band extending from D. 52—H. 170.

Region of greatest absorption E. 82—H. 170.

Azobenzol Fast-Crimson.

Dissolved $\frac{1}{4}$ grm. in 1 litre of water and examined the spectrum. A band was obtained, extending from C. 46—H.170. Region of greatest absorption D. 52—H. 170.

The same diluted to 1 pt. in 40,000 showed a band extending from D. 50—H. 170. Region of greatest absortion D. 66—H. 170. The same, plus caustic soda, gave a band extending from C. 48—H. 170. Region of greatest absortion D. 64—H. 170.

From the above it will be seen, that the spectra of these colors, resemble one another so closely, that it is quite a difficult matter to recognize them with the spectroscope, and this can only be done by strictly adhering to the strength of solutions indicated. In conclusion I would state, that in working with very dilute solutions, I found that the absorption bands continually recede from the red toward the green and blue parts of the solar spectrum, until a certain dilution has been reached, when they disappear altogether. Acids but have little action upon the spectra while caustic soda produces a more marked effect.

ON THE ACTION OF DIAZO-β-NAPHTHALENE ON PHENOLS.

By J. H. Stebbins, Jr.

Since the discovery, that β-naphthole could be converted into β-naphthylamine by the action of ammonia, under pressure, a new field for the production of azo-colors has been opened up. These compounds would, of course, be isomeric with those derived from α-naphthylamine, or rather diazo-α-naphthalene.

It has been mentioned by several writers that β-naphthylamine may be diazotized, and combined with phenoles, to form new azo-compounds, but in no case have any such compounds been described.

Being desirous of obtaining an insight into the nature of these bodies, I treated diazo-β-naphthalenechloride with such phenoles as I had at command, and obtained the following results:

Phenol-azo-β-naphthalene.

$$\beta\ C_{10}H_7—N=N—C_6H_4\ OH$$

This compound was obtained as follows:

10.2 grms. β-naphthylamine were dissolved in 12.7 grms. HCl. (1.2 Sp. Gr.), diluted with 500 c. c. water at gentle heat filtered, and allowed to cool.

When cold, the solution was treated, under constant stirring, with 5 grms. $Na\ NO_2$ dissolved in 50 c. c. water.

The diazo-β-naphthalenechloride thus formed was allowed to rest for an hour, and then mixed with a solution composed of phenol 6.7 grms., Na OH 5.7 grms., and water 200 c. c. A brick-red precipitate was immediately formed. This was collected on a filter and allowed to dry. It was purified by dissolving it in NaOH and water, reprecipitating it with acetic acid, and finally crystallizing from benzene.

It is deposited from this solvent in groups of small, pale-yellow, cigar-shaped crystals, slightly soluble in cold water, and melting to a resinous mass in boiling water. It dissolves freely in caustic soda, from which it is reprecipitated unaltered by acids, is soluble in alcohol with a yellow color, and in strong sulphuric acid with a deep crimson color. Melting point about 100° C.

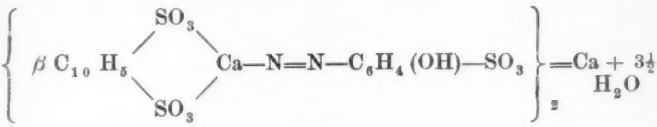
The body is probably formed according to the following equation:

$$\beta C_{10} H_7 N{=}N\text{-}Cl + C_6H_5 OH{=}\beta C_{10} H_7{-}N{=}N{-}C_6H_4 OH + HCl.$$

On heating one part of the dyestuff with 3 pts. of fuming sulphuric acid, on the water bath for about an hour, a sulpho-acid is formed. The melt is dissolved in water, neutralized with $CaCO_3$, and filtered from the $Ca\,SO_4$.

The filtrate, on being concentrated by evaporation, deposits when cold the acid lime salt of the new sulpho-acid as a network of microscopic needles, which by transmitted light appear yellow, and in reflected light red-brown.

Determinations of S and Ca prove this body to be the acid Ca salt of phenol-azo-β-naphthalenetrisulpho-acid.



Found.

(1.) 0.8703 grm. substance lost on drying at 110°C. 0.0577 grm. of water, $=6.6\% = 3\frac{1}{2}$ mols. H_2O.

(2.) 0.8126 grm. anhydrous salt gave 0.333 grm. $Ca\,SO_4$. Equivalent to calcium 0.097 grm. or Ca—11.93%.

(3.) 0.5 grm. anhydrous salt gave $Ba\,SO_4$ 0.4648 grm. Equivalentto sulphur 12.76%.

Theory requires.

Calcium	12.87%
Sulphur	13.73%

Although the figures obtained are somewhat too low, yet I have no hesitation in pronouncing the new compound to be constituted as above set forth, as the figures obtained are too high for a disulpho-acid, and much too low for a tetrasulpho-acid, which requires 19.8% sulphur. The discrepancy in the figures is probably due to some impurity in the compound examined, which I had not perfectly removed. The free sulpho-acid (assuming the above to be correct) would, therefore, be represented by one of the following formulae:

1. $\beta\, C_{10} H_5 (HSO_3)_2{-}N{=}N{-}C_6H_3 (HSO_3) OH.$
2. $\beta\, C_{10} H_6 (HSO_3){-}N{=}N{-}C_6H_2 (HSO_3)_2 OH.$

Which of the above two formulae is the correct one, I have thus far not been able to decide. The formation of a diazo-compound was not observed.

Orthocresol-azo-β-naphthalene.

$$\beta\ C_{10}H_7—N=N—C_6H_3\ (CH_3)\ OH.$$

10.2 grms. β-naphthylamine were diazotized with 12.7 grms. H Cl (1.2 Sp. Gr.) and 5 grms. sodium nitrate, and the solution thus obtained, after resting for an hour, was added to a solution composed of ortho-cresole 7.7 grms., caustic soda 5.7 grms. and water 200 c. c. A copious, brownish-yellow, precipitate was immediately formed. It was collected on a filter, washed and dried. It dissolves in toluene, ether, petroleum ether, alcohol, and glacial acetic acid, but does not crystallize from any of these solvents. It is soluble in caustic soda, and is reprecipitated unaltered by dilute acids. It melts in boiling water to a resinous mass, undergoing at the same time partial decomposition. Heated on the water bath with fuming sulphuric acid, it undergoes total decomposition, so that a sulpho-acid could not in this case be produced. For lack of material I was unable to analyse it, but have no doubt that it is formed according to the following reaction :

$$\beta C_{10}H_7\ N=N—Cl + C_6H_4\ (CH_3)\ OH = \beta\ C_{10}H_7—N=N—C_6H_3\ (CH_3)\ OH.$$

Owing to the unsatisfactory nature of this body, it was not further investigated.

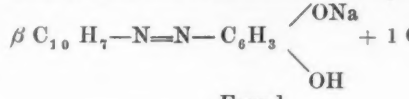
Resorcin-azo-β-naphthalene.

$$\beta\ C_{10}H_7—N=N—C_6H_3\ (OH)_2$$

10.2 grms. β-naphthylamine were dissolved in 12.8 grms. H Cl (1.2 Sp. Gr.) diluted with 500 c. c. water, and diazotized with 5 grms. $NaNO_2$. The β-diazonaphthalenechloride thus obtained was added, under constant stirring, to a solution composed of resorcine 7.8 grms., caustic soda 5.7 grms. and water 200 c. c. A red-brown precipitate was immediately formed. This was collected on a filter, washed, dried, and finally treated with caustic soda, which dissolves a part of the precipitate. The insoluble residue was washed, dried, and set apart for further examination. The filtrate was acidified with HCl, which threw down a yellow-brown precipitate ; this precipitate is the acid, soda salt of resorcin-azo

β-naphthalene. It was collected on a filter, washed with cold water, dried, and dissolved in alcohol, from which on cooling it crystallises in bunches of microscopic, yellow needles, which melt at 200° C., undergoing total decomposition. This compound probably has the following formula, and agrees very closely with the figures obtained by analysis :

Acid sodium salt of resorcin-azo-β-naphthalene.



$$\beta\,C_{10}H_7{-}N{=}N{-}C_6H_3\begin{matrix}ONa\\OH\end{matrix} + 1\,C_2H_6O.$$

Found.

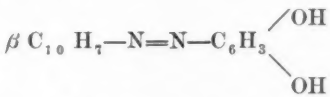
Nitrogen 9.53%

Theory.

Nitrogen 9.79%

It crystallizes with one molecule alcohol of crystallization, as will be seen from the analysis.

0.463 grm. substance lost on drying at 110°C. .002 grm. alcohol, =0. 45%, = 1 mol. C_2H_6O. The free acid would, therefore, have the formula



$$\beta\,C_{10}H_7{-}N{=}N{-}C_6H_3\begin{matrix}OH\\OH\end{matrix}$$

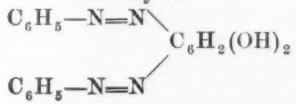
On being heated with 3 pts. of fuming sulphuric acid on the water bath for 3 hours, a sulpho-acid is formed, which, for want of time, I have not further investigated.

The residue insoluble in caustic soda, referred to above, was dissolved in alcohol, which, on being concentrated, deposited the new compound, in the shape of flat, reddish-brown prisms. Melting point 143–144°. It was first thought that this substance might be a diazo-compound, but a nitrogen estimation proved this not to be the case.

Found

Nitrogen 4.4%

Theory for



$$C_6H_5{-}N{=}N\diagdown\!\diagup C_6H_2(OH)_2$$

$$C_6H_5{-}N{=}N\diagup\!\diagdown$$

Nitrogen 13.4

The exact nature of this compound I have as yet not discovered, but hope to do so in future.

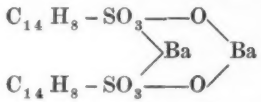
ON BETAPHENANTHROLMONOSULPHO-ACID.

By Wm. Rupp.

This acid was prepared by heating one part of β phenanthrol (Morton and Geyer, Jour. Am. Chem. Soc., II., 205) with two parts of sulphuric acid, on the water bath for five hours. The resulting product was dissolved in water, neutralized with lead carbonate, and the sulpho-acid set free, by precipitating the lead with sulphuretted hydrogen. The free acid, $C_{14}H_8(HSO_3)OH$ is soluble in water, alcohol and ether, but could not be obtained in a crystalline form. After the solvent had evaporated it always formed a black, pitch-like mass, even when the concentrated solution was quite light in color. All attempts to decolorize it were unsuccessful.

The lead salt is slightly soluble in cold water, and quite soluble in boiling water.

With an excess of barium hydrate, a light grey amorphous precipitate is formed, which was found to be the neutral barium salt.



Theory,	Ba	44.1
Found,	Ba	42.5

The barium salt is insoluble in cold and boiling water and in acids.

ABSTRACTS.

GENERAL AND INORGANIC CHEMISTRY.

On Faraday's Law. M. Berthelot.

Equal electric currents, passing through electrolysable salts, separate in equal times weights of the several metals proportional to their equivalents. Thus the same current precipitates at the negative pole 107·9 grammes of silver ; 103.5 of lead ; 39.1 of potassium ; 68.5 grammes of barium. To make them proportional to atomic weights, there should be for 107.9 grammes of silver, 207 of lead, *i. e.*, double the weight actually thrown down. Also for 39.1 grammes of potassium, there should be 137 gr. of barium, which is not the case. In the same manner for electro-negative elements, the weights separated are 35.5 of chlorine, 8 of oxygen, and not 16 of oxygen.

The idea of plurivalence is older than the new atomic notation. This idea is the same for chemists who use equivalent weights, as for those who prefer atomic weights, and has nothing to do with the fact that Faraday's law is expressed more simply by equivalents than by atomic weights, in the case of electro-positive, as well as in the case of electro-negative elements. (*Comptes Rend.* XCVIII. 264.)

P. C.

Note on Faraday's Law. A. Wurtz.

In the interpretation of Faraday's law, atomic weights do not enter; the question is one of *valency*. The weights of plurivalent metals deposited at the negative pole do not agree with the *equivalents*. In the electrolysis of cuprous chloride, for 35.5 of chlorine at the positive pole, 63.5 of copper are deposited on the negative pole, and this number is not the *equivalent* of copper. In the electrolysis of bismuth chloride, 70 of bismuth are deposited. This number is not the equivalent of bismuth.

M. Wurtz adds: "Mr. Berthelot accepts this statement. If he prefers, in interpreting Faraday's law, to use numbers established forty years ago, which, in the case of plurivalent elements, do not represent equivalent quantities, it is only a question of personal choice, and I have nothing to object."

(*Comptes Rend.* XCVIII. 321.) P. C.

Liquefactions of Hydrogen. S. Wroblewski.

Hydrogen is compressed to 100 atmospheres, in a vertical tube of 2 millimetres, exterior diameter, and from $\frac{2}{10}$ to $\frac{4}{10}$ mm. interior diameter. A screw permits release of pressure more abruptly than in M. Cailletet's apparatus. After cooling the tube by a succession of ebullitions of oxygen, the author noticed, in the hydrogen tube, when the gas expands, an ebullition analogous to that observed by M. Cailletet in oxygen. It takes place a short distance from the bottom of the tube, but is less distinct, because of the feeble density of liquid hydrogen.

In discussing this paper, M. Cailletet said that he had compressed hydrogen at 300 atmospheres. On expansion a thin fog was visible throughout the entire tube, showing liquefaction of hydrogen. (*Comptes Rend.* XCVIII. 304.)

P. C.

Heat of Formation of Fluoride, Chloride and Oxychlorides of Antimony. M. Guntz.

From the thermochemical results obtained, the author concludes that a definite compound, $SbF_3.3\,HF$ forms, which, however, he has as yet been unable to isolate.

The heat of formation of $Sb\,Cl_3$ from the oxide was found to be 47°.4 cal. The oxychloride $Sb\,O_2\,Cl$, formed in the same manner corresponded to the highest thermal effect. Attempts to prepare a pure hydrate, $Sb\,O_3$, 3 HO, were unsuccessful. (*Bul. Soc. Chim.* XLI., 370.)

E. W.

Russian Chemical Society. Correspondence of O. Davidoff.

M. Tchijeosky has investigated the volatilization of salts by evaporation of their aqueous solutions with regard to some alkaline carbonates. The conclusions are, 1st, That the amount of salts removed with the aqueous vapor are sometimes quite considerable. 2d, That the volatilization of the salt increases with the concentration of the solution up to a maximum, after which it diminishes. It is *nil* for the dry salt (at 100°). 3d, The volatilization increases with the increase in molecular weight of the salt. Thus it is so small for lithum salts that it could not be determined, and is greater for sodium potassium and rubidium salts.

M. Prokofieff notes analogy between B and C_2H_3 thus B_2O_3 and acetic anhydride $(C_2H_3)_2O_3$; $Na_2B_4O_7$ and $K_2(C_2H_3)_4O_7$, the salt obtained by combination of acetic anhydride with postassium acetate; B N and acetonitrile, C_2H_3N. Thus far the author has not been able to prepare B N.

M. Lubavine gives the analysis of a phosphorite of Nijni Novgorod. Dried at 110° the results were as follows:

Hygroscopic moisture	2.13
Organic substance	0.61
Silica soluble in soda solution	5.84
Residue insoluble in HCl and in soda, (principally SiO_2)	8.99
CO_2	4.13
P_2O_5	25.46
SO_3	0.09
CaO	35.49
MgO	0.61
MnO	0.16
Fe_2O_3	4.42
Al_2O_3	4.99
Na_2O	0.72
K_2O	0.59
CaF_2	4.16
	98.39

(*Bul. Soc. Chim.*, XLI., 390.) E. W.

On Haydenite. H. N. Morse and W. S. Bayley.

Haydenite from the gniess quarries near Baltimore, was found to contain 1.46–1.46% of BaO, a constituent not previously reported in this mineral. A complete analysis is given. Haydenite is considered by the author to be identical in composition, crystalization and physical properties with chabazite. (*Am. Chem. Jour.*, **6**, 24.)
A. A. B.

The Physiological Effect of Boracic Acid. J. Forster.

An abstract from the Berichte (1883, p. 1754.) Taken with the food in small doses 0.5 — 3.5 grms. per day B_2O_3 increases the proportion of solid excrements and increases also the proportion

of N and dry substance in these. The effect is to carry off albuminous matters by making them insoluble, possibly also the *wear* of the intestines is greater, a greater quantity of epithelium, etc., being therefore carried off. Separation of gall is notably increased The use of boracic acid is especially to be avoided in connection with milk and egg foods, and especially in the case of children or sucking infants. (*Ding. Pol. J.* **251**, 170.) A. A. B.

On the Physiology of the Carbohydrates in the Animal System. F. W. Pavy.

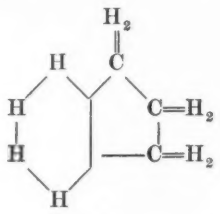
By a series of experiments it is found that the ferment which effects the transformation of glucose into a body of lower copper-reducing power resides principally in the paunch, reticulum and third stomach (many plies) of the sheep, the fourth, or true stomach, yielding little of this ferment, and the intestines none at all. The results were obtained by artificial digestion of the carbohydrate in question with portions of the stomach, etc., of recently killed animals. The minimum copper-reducing power in a product of digestion of glucose was one in which this power was to that of glucose as 40 to 100. In contradiction of the statement of Bernard, digestion of cane sugar is found to take place, although in lesser degree, in the *stomach* and is *not* confined to the small intestine. In the ruminants this function resides almost exclusively in those parts of the digestive apparatus anterior to the true stomach. With large quantities of the ferment, cane sugar is wholly inverted, but with reduced quantity or time of exposure maltose, dextrine or unchanged cane sugar are found. Cane sugar was distinguished from maltose in the products by its ready inversion on boiling with weak (2%) solution of citric acid. Maltose requires sulphuric acid for inversion. Cane sugar taken into the stomach is not found as such in the portal blood nor as glucose, but as a product of lower reducing power approximating that of maltose. (*Chem. News.* XLIX. 154, *et seq.*) A. A. B.

ORGANIC CHEMISTRY.

On some Derivatives of Hydrindonaphthene. ADOLF BAEYER and W. H. PERKIN, JR.

By treating orthoxylene bromide with the sodium salt of malonic acid ether, both the methyl groups of xylene unite with the middle carbon atom of a malonic acid ether, forming the ether of a dicarbo-acid which contains two hydrogen atoms more than indonaphthene, and which the authors call hydrindonaphthene.

The formula of this compound may be expressed as follows:



The authors likewise produced hydrindonaphthonemono- and dicarbo-acids. (*Ber. d. Ch. Ges.* 1884, 122.) J. H. S. Jr.

On the Action of Hydroxylamine on Nitriles. FERD. TIEMANN.

An aqueous solution of hydroxylamine chloride on being shaken up with a concentrated ethereal solution of benzaldehydecyanhydrine, deposits after a while, crystals, the yield of which is increased by several days shaking of the mixture. The compound thus formed was found to have the formula $C_8 H_{10} N_2 O_2$ and is therefore simply an addition product of benzaldehydecyanhydrine and hydroxylamine. This compound has the properties of an amido-acid, as it is dissolved readily both by acids or alkalies.

Hydroxylamine chloride and benzonitrile unite under similar circumstance to form the addition product $C_7 H_8 N_2 O$.

This compound has properties similar to the previous one.

(*Ber. d. Ch. Ges.* 1884, 126.) J. H. S. JR.

On *p*-Azo-kresol. C. LIEBERMANN and ST. v. KOSTANECKI.

The general impression that the azo-group in combining with the phenole, takes up the para-position in relation to the hydroxyl, has been found to be erroneous, as the authors were able to produce an azo-compound directly from *p*-cresol, in which the para-position is already occupied by the methyl group. In this case, therefore, the azo-group would have to take up another position.

Phenyl-azo-*p*-cresol

$$C_6H_5—N=N—C_6H_3\begin{cases}OH\ (1)\\ CH_3\ (4)\end{cases}$$

This compound is formed by the action of diazobenzole on *p*-cresol. It crystallizes in little leaflets with golden lustre. Melting point 108° C.

Phrenyl-azo-(o)-cresol.

$$C_6H_5—N=N—{}_6C H_3\begin{cases}OH\ (1)\\ CH_3\ (2)\end{cases}$$

Prepared by the action of diazobenzol on orthocresol. Crystalizes in little leaflets or needles, with golden lustre. Melting point 128–130° C. (*Ber. d. Ch. Ges.* 1884, 130.) J. H. S. JR.

On a Blue Dyestuff from Pyrrol. G. L. CIMICIAN and P. SILBER.

By treating pyrrole with an aqueous solution of isatine and dilute sulphuric acid, the authors obtained a blue dyestuff. It was found, however, that glacial acetic acid was preferable to the sulphuric acid.

2 pts. isatine were dissolved in 50 pts. warm glacial acetic acid and added to the boiling solution of 1 pt. of pyrrol. The mixture turns dark blue and on being poured into cold water and neutralized with sodium carbonate it is obtained in the shape of a fine powder.

The analysis leads to the formula $C_{24}H_{18}N_4O_3$

(*Ber. d. Ch. Ges.* 1884, 142.) J. H. S. JR.

Preliminary Communication. H. KILIAN and S. KLEEMANN.

The authors state that by treating gluconic acid with strong hydrobromic acid, it is converted into normal caprolactone.
(*Ber. d. Ch. Ges.* 1884, 143. J. H. S. JR.

On the Behavior of Diamines with Nitrous Acid. A. LADENBURG.

The author in a former paper had shown that orthophenylendiamine on being treated with nitrous acid forms azimidobenzole, whereas metaphenylendiamine under the same circumstances forms phenylene brown. Paraphenylendiamine, which he had not previously examined, forms the subject of this paper.

Paraphenylendiamine was converted into diacetyl paraphenylendiamine. This with nitric-acid gave nitrodiacetylparaphenylendiamine, which on being boiled 15 minutes with fuming HCl, splits up into nitrophenylendiamine. If a dilute sulphuric acid solution of this substance be treated with $K N O_2$, a brown, amorphous precipitate is formed which has no similarity to the bodies derived from the other phenylendiamines.

Paraphenylendiamine in dilute HCl solution, on being treated with $K N O_2$, is changed very little at first, but after standing a long time yields a brown, amorphous precipitate with the formula $C_{12} H_{12} N_2 O_3$. (*Ber. d. Ch. Ges.* 1884, 147.) J. H. S. JR.

Synthesis of Piperidine. A. LADENBURG.

The author finds that piperidine is obtained from pyridine by treating its alcoholic solution with sodium. The yield is small.
(*Ber. d. Ch. Ges.* 1884, 156.) J. H. S. JR.

On 1 : 2 : 4 : Orthoxylidine. OSCAR JACOBSEN.

Nitroorthoxylol was first prepared by treating pure orthoxylol with 8 times its weight of fuming nitric acid. It crystallizes from alcohol in light yellow prisms. Melting point, 29° C. This on reduction with iron filings and acetic acid, or with tin and hydrochloric acid, gave orthoxylidine. ($C_6 H_3 \overset{1}{C} H_3 . \overset{2}{C} H_3 . \overset{4}{N} H_2$.)

This compound crystallizes in tables. Melting point, 49°. Boiling point, 226° C. (*Ber. d. Ch. Ges.* 1884, 159.) J. H. S. JR.

On Nitroorthotoluic Acid. OSCAR JACOBSEN.

This compound was obtained by oxydizing 25 grms. of nitro-orthoxylol with 250 c. c. nitric acid (sp. gr. 1.4) diluted with 500 c. c. water. The mixture is heated with return cooler for 48 hours. Two nitroorthotoluic acids are thus formed.

One of them melts at 179° C. The second acid melts at 152° C., and is designated by the author as γ-nitroorthotoluic acid.

(*Ber. d. Ch. Ges.* 1884, 162.) J. H. S. JR.

Action of Methylene Chloride on Toluene and Benzene. C. FRIEDEL and J. M. CRAFTS.

With methylene chloride and toluene in presence of aluminium chloride, the principal products of the reaction were ditolylmethylene and dimethyl anthracene. No hydrogen was evolved, but small amounts of para- and metaxylene were found to have been produced. On substituting benzene for toluene, diphenylmethane and anthracene were formed, as also some toluene. The experiments are still in progress. (*Bul. Soc. Chim.*, XLI., 322.) E. W.

On two Campholurethanes, physically isomeric, analogous to the right and left Tartaric Acids of M. Pasteur. A. HALLER.

Fifty grammes of camphol of Ngai, dissolved in 150 grms. of toluene, are treated with 6 grms. of sodium. When almost all of the sodium has entered into combination, a current of dry cyanogen is passed in until the liquid begins to be colored. After agitating with water, and decanting, the mixture is distilled. The solid mass remaining is heated to 100° and the borneol which has not been acted upon passes off and sublimes. By extracting the residue with boiling water, the urethane is removed, and the residue, by extraction with alcohol, affords left-handed borneol carbonate. The left-handed urethane is deposited from the boiling water in fine needles. It fuses at 126–127° C. and the solutions rotate the polarized ray to the left, α. (D.) = —29.90°. The crystals of the right and left-handed campholurethane are compared. In the formation of these compounds borneol carbonate is always formed. Another derivative is also formed in the reaction, which is but slightly soluble in alcohol and ether. This compound appears to

have no analogous right-handed compound. Further study of this compound is proposed. (*Bul. Soc. Chim.*, XLI., 327.) E. W.

Note on Ethyl- and Methylacetylcyanate of Ethyl. A. HELD.

After preparing ethyl- and methylacetylacetic ethers by the process of Conrad and Limpach, these products were treated with sodium ethylate, and the solution saturated with dry cyanogen chloride; the result was the formation of ethyl- and methyl-acetylcyanates of ethyl. The ethyl compound boils at 105° to 110° under a pressure of 15 to 20 mm. mercury; it is a colorless liquid with a pleasant, ethereal odor; Sp. Gr. 0.976 at 20°, soluble in alcohol and ether, and insoluble in water and alkaline solutions. The methyl compound is similar in solubility, etc., to the above. Sp. Gr. 0.996 at 20°. Boils at 90° to 95° under pressure of 15 to 20 mm. mercury. (*Bul. Soc. Chim.*, XLI., 330.) E. W.

On the Oxidation of Menthol by Potassium Permanganate. G. ARTH.

By the action of potassium dichromate and sulphuric acid, Morija obtained a compound, $C_{10}H_{18}O$, which he called *menthone*. By the use of potassium permanganate and sulphuric acid, according to a method here described, the author obtained a substance which had a strong odor, recalling somewhat that of valerianic acid. It appeared to be a mixture of at least two acids, one of which was apparently $C_{10}H_{18}O_3$. The second acid has not yet been isolated for examination. (*Bul. Soc. Chim.*, XLI., 330.) E. W.

On the Preparation of a Propyl and an Amyl Naphthalene. L. ROWX.

A mixture of 200 gms. of naphthalene with 120 gms. propyl bromide are heated together in a flask with an inverted condenser. When distillation begins, about 10 grms. aluminium chloride are added, a little at a time, the flask being agitated during the addition. Hydrobromic acid is disengaged abundantly, and these vapors are condensed in a tared flask. The heating is continued, and when the amount of hydrobromic acid evolved is nearly the theoretical amount, the flask is allowed to cool; 3 to 400 grms. CS_2 are added to complete solution, the products are treated with water, the CS_2 is decanted, and the material is dried and distilled

fractionally *in vacuo*. The main portion consists of a product $C_{10}H_7(C_3H_7)$ boiling at 262°—267° at ordinary pressures; vapor density (Meyer's method) 5.85. Probably isopropyl naphthaline. By substituting amyl chloride for propyl bromide in the above process amyl naphthalene, $C_{10}H_7(C_5H_{11})$, was obtained, boiling at 288°—292°. The above formed compounds with picric acid, the propyl compound fusing unchanged at 89° to 90°, the amyl compound also fusing unchanged at 140° to 141°.

Small amounts of isodinaphthyl were produced, which appeared to be formed in consequence of the presence of an alcoholic chloride. (*Bul. Soc. Chim.*, XLI., 319.) E. W.

Action of Chlorinated Aldehydes on Benzene. A. COMBES.

To a solution of chloral in excess of benzene, aluminium chloride was added in small portions. A perceptible reaction took place in the cold, and on heating to about 70° much HCl was evolved. By washing with water and distilling off the benzene, a compound remained, distilling *in vacuo* at 175°—185°, colorless when distilled, quite viscous, and with pleasant, aromatic odor; $C_6H_5CCl_2$, COH, HCl. Distilled in the air it loses HCl and gives, consequently, a boiling point varying between 265° and 290°. It reduces Fehling's solution and $AgNO_3$ and combines with difficulty with sodium bisulphite. KHO in the cold removes from it the HCl; heated, it affords benzoic aldehyd.

An attempt to obtain other aldehydes by the action of the aluminium chloride upon the chloral in benzene was unsuccessful, the product being either triphenylethane or tetraphenylethylene, the latter point remaining unsettled. (*Bul. Soc. Chim.*, XLI., 382.) E. W.

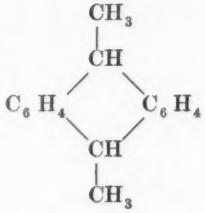
On the Synthesis of Dimethylanthracenehydride and Diphenylethane. A. ANGELBIS AND R. ANSCHÜTZ.

On heating ethylidene chloride or bromide and benzene, with aluminium chloride, diphenylethane was formed, according to the following reaction:

$$\begin{matrix} CHCl_2 \\ | \\ CH_3 \end{matrix} + 2\,C_6H_6 = \begin{matrix} CH(C_6H_5)_2 \\ | \\ CH_3 \end{matrix} + 2\,HCl$$

This compound boils at 150°. It is colorless, but has a blue fluorescence. The analysis of the picrate of this hydrocarbon showed that it has the formula $C_{16}H_{16}$, obtained according to the following reaction, $2\,CH_3CHCl_2 + 2\,C_6H_6 = C_{16}H_{16} + 4\,HCl$. The pure hydrocarbon melts at 178°—179° and sublimes in transparent, light yellow, flat needles. It is easy soluble in ether, benzene, carbon disulphide, hot glacial acetic acid, and alcohol.

On oxidation with an excess of chromic acid, it splits up into anthrachinone and carbon dioxide. Taking these facts into consideration, the body would have the following structural formula:



The picrate of this new hydrocarbon, is represented by the formula, $C_{16}H_{16}—C_6H_2(NO_2)_3—OH$. Crystallizes in reddish blue needles, melting point 170° C. (*Ber. d. Ch. Ges.* 1884. 165.)

J. H. S., Jr.

On the action of Aluminium Chloride on Vinyl bromide in Benzene, and Vinyl tribromide in Benzene. A. Angelbis and R. Anschütz.

On passing a uniform current of vinyl bromide through a mixture of benzene and aluminium chloride, and then distilling the mixture, the following compounds were obtained:

1. Ethylbenzene. 2. Diphenylethane. 3. Dimethylanthracenehydride.

The authors expected that by treating vinyl tribromide in the same manner they would obtain triphenylethane, but they were unable to isolate this compound. The only product they could separate was, strange to say, diphenylethane. (*Ber. d. Ch. Ges.*, 1884. 167.)

J. H. S., Jr.

Remarks on the Previous Communication. R. Anschütz. (*Ber. d. Ch. Ges.*, 1884. 169.)

J. H. S., Jr.

On the Synthesis of Anthrachinoline. C. GRAEBE.

This investigation was undertaken, with the view of determining whether the same compound would be obtained by heating anthramine, nitrobenzol and sulphuric acid together, as that derived from alizarine blue, by heating it with zinc dust. This, on experiment turned out to be the case, for on heating anthramine, glycerine, nitrobenzol and sulphuric acid together, an anthrachinoline melting at 170° C. was obtained. (*Ber. d. Ch. Ges.* 1884. 170.) J. H. S., JR.

On Sinapic Acid. I. REMSEN and R. D. COALE.

Sinapine, a base existing as sulphocyanate in the alcoholic extract of mustard seed, was made to yield the above acid by boiling with baryta water instead of with caustic potash as in the original method of von Babo and Hirschbrunn. The product crystallized from a mixture of alcohol and water in small, yellowish, transparent prisms fusing at 192°, and yielding, on analysis, results which accord best with the formula $C_{11}H_{12}O_5$, originally given by v.B. and H. Analysis of Ca and Ba salts indicate that it is a monobasic acid, with one hydroxyl. Fused with caustic potash it yields a body giving the reactions of pyrogallol. The authors believe sinapic acid to be a derivative of gallic acid, probably butylene gallic acid, and are endeavoring to effect its synthesis. (*Am. Chem. Jour.*, **6**, 50.) A. A. B.

Russian Chemical Society. Correspondence of O. DAVIDOFF.

M. Koutcheroff finds in regard to action of allylene on mercuric oxide and its salts, 1. That in acid solutions substances are formed which generate acetones by the action of acids. They may be considered as combinations of basic salts with C_3H_4HgO. In alkaline solutions a substitution product of $(C_3H_3)_2Hg$ is formed which affords allylene by the action of acids. 2. That hydration of allylene is only a special case of the above reaction. At an elevated temperature it is continuous, complex mercury compounds being formed which decompose with formation of acetone. 3. That the structure of the acetones formed depends upon that of the hydrocarbons from which they are derived. The rules for their formation are given. (*Bul. Soc. Chim.*, XLI, 388.)

E. W.

ANALYTICAL CHEMISTRY.

On the Reversion of Phosphoric Acid. T. S. GLADDING.

The author has previously shown that the reverted phosphates of commercial superphosphates contain iron and aluminium, as well as calcium, but that the reverted phosphates of the two former metals are soluble in ammonium citrate, only at 65° C, while reverted calcium phosphates dissolves completely at 40° C. These properties are used to distinguish the different phosphates in the work now described.

Neutral ammonium citrate is found to act least upon the insoluble phosphates present.

The fact of reversion of phosphoric acid in soils by iron and alumina was established by a series of experiments, in which natural and artificial soils were treated with solutions of phosphates of known strength, and after exposure to air and drying for several days, were examined for reverted phosphates of iron and alumina. A method for analysis of superphosphates is added. (*Am. Chem. Jour.*, **6**, 1.) A. A. B.

On the Determination of Nitrogen by Combustion with Calcium Hydroxide. S. W. JOHNSON.

Pure slaked lime, dried at a moderate heat to remove excess of moisture, is now used instead of the mixture of sodium carbonate and lime heretofore used by the author. The anterior layer of pure lime should be somewhat longer than the mixture of lime and substance and should be heated to full redness before heating the mixture. The tube is allowed to cool below redness before aspiration. Reddening of acid in the bulb is rare when pure lime is used. Standard NH_3 and HCl are used, with cochineal as indicator. Determinations of nitrogen in many substances were made by the old and new methods respectively; the results agree very well. (*Rep. Conn. Ag. Exp. Station*, 1883.)

A. A. B.

Note on the Analysis of Soils. A. GUYARD.

For *easily assimilable elements* treat 100 gms. of the soil in the cold with a cooled mixture of 150 c.c. of HCl and 150 c.c. of

water. Filter; wash first with cold, finally with boiling water, and determine the lime, magnesia, alkalies and phosphoric acid in solution. For assimilated elements, calcine, 100 grms. of soil at as low a temperature as possible, cool, treat, cold, with 300 c.c. dilute HCl, and proceed as before. The difference between the results of the first and those of the second analysis represents the assimilated elements contained in the organic matters of the soil.

A third analysis on the material extracted from the soil by boiling *aqua regia* may be of advantage as a check upon the other two. (*Bul. Soc. Chim.* XLI, 384.) E. W.

Note on the Determination of Ammoniacal Nitrogen in Soils. A. GUYARD.

The ordinary method of using 2 to 4 grms. magnesia to 100 of the soil gives not only ammonia actually existing in the soil, but also some of the ammonia due to organic nitrogen present. It is recommended to take the amounts of the reagents given below per 100 grms. of soil for separate determinations. For ammoniacal nitrogen, calcium carbonate 10 grms.; organic nitrogen readily transformable into ammonia, magnesia subcarbonate 5 grms.; nitrogen tolerably easily converted into ammonia, calcined magnesia 2 grms.; nitrogen transformable into ammonia, calcined lime 1 grm.; second portion of nitrogen transformable into ammonia, caustic potash or soda 0.5 to 1 grm.; finally organic nitrogen by combustion with soda lime. (*Bul. Soc. Chim.*, XLI., 337) E. W.

Note on the Separation and Determination of Lime, even in Presence of great Excess of Alumina, Magnesia, Ferric Oxide and Phosphoric Acid. A. GUYARD.

After addition of an excess of ammoniacal ammonium citrate, the lime can be precipitated by ammonium oxalate, free from the other substances here mentioned. If a small amount of silica is in solution, it will be partially precipitated, carrying with it some iron and ammonia. If the precipitation is effected at 70° to 80°, no magnesia will be found in the precipitate, though phosphoric acid may be present. Calcium oxalate is soluble in a mixture of acetates and acetic acid even when dilute. (*Bul. Soc. Chim.*, XLI., 339.) E. W.

On a New Volumetric Method for the Estimation of Nitrous Acid. A. G. Green and S. Rideal.

The method depends upon the formation of diazo-benzol by action of nitrous acid on aniline. A decinormal solution of pure aniline is used, containing rather more than twice its equivalent of acid, half of the latter being sulphuric and half hydrochloric acid. The nitrate in a solution between decinormal and centinormal strength, is added in a series of rough experiments to constant quantities of the aniline solution until a result is obtained in which iodide-starch solution yields only a faint blue coloration. From this approximative result an accurate titration is made. The standard aniline solution should be diluted with about four times its volume of water, and the whole solution in the final titration should be about decinormal. The process has been tested with pure sodium nitrate and found accurate within 0.1%. Apart from its delicacy it is applicable to cases in which the presence of oxidizable substances forbids the use of the permanganate process. (*Chem. News* XLIX., 173.) A. A. B.

Some Remarks on the Determination of Hardness in Waters. H. Jackson.

The author finds that the difficulty experienced in determination of hardness of water by Clark's method, when salts of magnesia are abundant in the water to be tested, may be overcome by heating the water to 70° C. without the necessity of dilution, which is the common expedient in such cases. Also he finds that by the use of solution of sodium oleate instead of soap, a satisfactory result is obtained in presence of magnesia salts in excess, without either dilution or heating. (*Chem. News* XLIX., 149.) A. A. B.

Analysis and Composition of Beeswax. O. Hehner.

3-5 grm. of wax are dissolved in 50 c.c. methyl alcohol, and the cerotic acid is titrated with an alcoholic potash solution, corresponding to 0.3 or 0.4 c.c. of normal H_2SO_4 for each c.c. After an excess of potash solution has been added, the myricin is saponified and calculated from the potash used on the basis of 1 c.c. normal alkali to 0.4 grm. of cerotic acid or to 0.676 grm. of myricin.

English wax contains, on an average, 14.40% cerotic acid and 88.9% myricin. The organic adulterations of wax are either stearic

or palmitic acids, stearin or palmitin, Japan or carnauba wax, spermaceti paraffin, &c.

Fat acids increase the neutralization co-efficient of the wax, and neutral fats lower it.

One part of stearic acid = 1.443 of cerotic acid, 1 part of a mixture of palmitin and stearin corresponds to 2.391 of myricin.

Japan wax contains palmitic acid and palmitin, spermaceti, being equal in value to the best wax, scarcely comes in question. Carnauba wax contains 6.09 % cerotic acid and 92.08 % myricin. It is used as an adulteration along with fat. Paraffin, when used alone as an adulteration can be detected by corresponding loss of neutralizing power in the sample. When other substances are present the proportion of pure wax is calculated after determination of cerotic acid as above, by multiplying the latter by 6.117 for myricin. Specific gravity of the waxes varies between .9625 and .9675. Paraffin and fats are lighter, rosin and fat acids are heavier. Paraffin .9171, rosin 1.0865, fat acids 1.002. (*Ding. Pol. J.* **251**.170.) (*Analyst*, 1883, 16) A. A. B.

On a New Reaction of Ethyl Carbonate. G. Arth.

By boiling ethyl carbonate with alcoholic potash in a vessel provided with a reversed condenser, potassium cyanate in considerable quantities was produced. Judging from his own and M. Haller's experiences, the author regards the reaction as a general one for all carbonic ethers. (*Bul. Soc. Chim.*, XLI., 334.) E. W.

Note on the Action of Air on Solutions of Tannin, and on the Examination of Tannins. A. Guyard.

Contrary to the assertions in some of the literature of the subject, solutions of tannin do not absorb oxygen and form gallic acid. The presence of a ferment is necessary to effect the transformation; an alkaline solution of tannin absorbs oxygen rapidly. Lead acetate acidulated with acetic acid can be used to separate tannic from gallic acid. The lead tannate is completely insoluble in this reagent, while the gallate is soluble. The lead may be removed from these compounds by sulphuric acid, and the acids titrated separately with permanganate. (*Bul. Soc. Chim.*, XLI., 336.) E. W.

INDUSTRIAL CHEMISTRY.

On the Gases Occluded in Cast Steel.

A review of recent work upon this subject, showing the present state of knowledge in regard to the relation between the composition of steel and the proportion of occluded gas or the occurrence of bubbles in its mass. The occluded gases consist largely of H and CO. The questions of relative affinity of Mn for C and Si at different temperatures and the influence of Mn and Si upon upon the retention of H in steel and the variation of such influence with temperature are discussed. Basic steel, according to Muller, contain mainly H and N, with little CO. The addition of spiegel or ferro manganese causes a reaction which produces CO, and this gas is absorbed by the steel to be set free at the moment of solidification. The discordant views of Muller and Pourcel in regard to the influence of Si in promoting the absorption of H, are reconciled in part by the observation of Brustlen, who finds that Si and Mn increase the permeability of steel for H, and so permit its escape without the production of bubbles. (*Ding. Pol. J.* **251.91**) A. A. B.

On the Properties of Certain Salts of Iron and Aluminum with Reference to their Use in Dyeing. L. Liechti and W. Suida.

A determination of the facility with which these salts were dissociated with liberation of acid and deposition of insoluble basic compounds under the influence of heat, dilution or the attraction of vegetable fibres. The salts used were sulphates, acetates, "sulpho-acetates" (obtained by partial decomposition of a sulphate in solution by lead acetate), nitrates, chlorides, and sulphocyanates of aluminum and (ferric) iron. Starting with normal salts e. g. $R_2\,3\,SO_4$, a series of basic salts, $R_2\,2\,SO_4\,(HO)_2$; $R_2SO_4\,(HO)_4$, etc., were obtained by action of alkaline carbonates. These definite salts, in solutions of known strength, were then submitted to the action of heat, dilution, etc., and the degree of temperature or dilution at which a precipitate appeared was noted, as well as the proportionate increase of base in such precipitate under higher temperatures, etc. Similarly, the solutions were submitted to the

action of textile fibres under varying conditions of temperature and dilution, and the proportionate deposition of oxide was determined subsequently in the ash of the fibre. The bearing of such experiments upon the operations of the dye-house will be readily seen.

The results, in general, show an increased tendency to dissociation with increase of basicity. With the degree of basicity constant, the salts of the same base with different acids, or of the same acid with different bases differ widely in their behavior under like physical conditions. (*Ding. Pol. J.* **251.** 285.) A. A. B.

On the Nitrogenous Constituents of Barley and Malt. C. LINTNER.

An investigation made to determine the relation of the proportion of nitrogen to the strength of the diastatic function in the above materials. Specimens of barley were carefully cleansed and malted, 25 grammes of the ground malt was digested for 6 hours, in each case at common temperatures, and the diastatic power of the filtered solution was determined. The malt in all cases was dried at 40°C. and the results, strictly speaking, relate only to malt made under these conditions or to green malt. Soluble nitrogen $\times 6.25$ expresses the diastase very closely. The mean proportion of diastase found in dry malt was 2 per cent. One part of diastase converts 400 of starch and the percentage of starch in a given amylaceous substance multiplied by 0.2075 gives the weight of green malt to be used. These results accord well with practice. (*Ding. Pol. J.* **251.** 225). A. A. B.

Method for the Preparation of Sodium Bicarbonate.—H. GASKELL and F. HURTER.

A patented method (D. R. P. Kl. 75.24490) in which anhydrous monocarbonate in revolving cylinders is submitted to the simultaneous action of steam and carbon dioxide. The gas and steam are mixed previously in a coke tower in such manner that CO^2 saturated with water at 82° C. shall enter the cylinder. The proportion of steam is reduced towards the close of the operation. The reaction proceeds rapidly and develops much heat; at its close dry bicarbonate ready for packing is withdrawn from the cylinder. Dilute CO^2, as in furnace gases, may be used, the gases

then being passed through a series of cylinders to induce complete absorption. (*Ding. Pol. J.* **251.** 229.) A.A.B.

On the Influence of the Ammonia Soda Process on the Value of Hydrochloric Acid and Chlorine. M. Scheurer Kestner.

Note relating to M. Weldon's paper on the ammonia soda process. (Soc. Ch. Ind. 1883. 434.) Leblanc's process affords both chlorine and sodium compounds, while the ammonia process affords only the sodium compounds.

The diminution in yield of HCl consequent upon the abandonment of the Leblanc process for the ammonia process has been, in part, at least, replaced by the spread of the manufacture of caustic soda, in which HCl is a by-product. The Weldon regenerative process affords only one-third of the chlorine in hydrochloric acid in the state of chlorine. It is desirable that some process should be discovered by which all the chlorine could be made available in the elementary form. (*Bul. Soc. Chim.*, XLI., 383.) E. W.

Notes on the Soda Industry. M. Scheurer Kestrier.

M. Reidemeister has completed his researches on the sodio-calcic compound formed in crude soda liquors from the Leblanc process. Two varieties were found, viz.: $Na_2CO_3 . CaCO_3 . 5H_2O$, and $2(Na_2CO_3 . CaCO_3) . 5H_2O$. (*Bul. Soc. Chim.*, XLI., 335.) E. W.

On the Decomposition of Cements by Water. H. LeChatelier.

Hydrated cements treated with a large excess of water, give up not only the lime present as hydrate, but also in time and after treatment with fresh quantities of water, they surrender nearly all of the lime in combination. Slow-setting cements contain much calcium hydrate; quick-setting cements very little.

The following lime compounds were recognized as existing in cements; the figures at the right giving the number of grammes per litre of calcium hydrate which will prevent the decomposition of these compounds (surrender of the lime).

$Ca(HO)_2$	1.3	gms.
Fe_2O_3. 4 CaO, 12 H_2O	0.6	"
Al_2O_3. 4 CaO, 12 H_2O	0.2	"
CaO. SiO_2, 3 H_2O	0.05	"

(*Bul. Soc. Chim.*, XLI., 377.) E. W.

On a Method of Obtaining Benzol from Coal-gas. J. A. KENDALL.

Coal gas passed over hot coal or coke in an iron retort yields an increase of benzol at the expense of luminosity. The best results were obtained when the gas was passed at the rate of 230 cbm. per hour through a bench of nine retorts, each three metres long and 203 mm. wide. The rate at which benzol was produced was measured in an experimental apparatus by passing a portion of the gas from the retorts through a mixture of one part strong HNO_3, and 5 parts conc. H_2SO_4, from which the resulting nitrobenzol was precipitated and weighed. (*Ding. Pol. J.* **251**, 83.) A. A B.

Falsification of Tartar-emetic.

The possibility of replacing this salt in many cases in the fixation of tannin (in dyeing) by zinc sulphate or acetate, has brought into the market so-called "substitutes" for it which contain 33–59% zinc sulphate. The cost per cent. of antimony oxide in these substitutes is to that in the pure salt as 12.24 to 7.00. (*Ding. Pol. J.* **251**, 288.) A. A. B.

Abstracts of American Patents Relating to Chemistry.

[FROM THE OFFICIAL GAZETTE OF THE U. S. PATENT OFFICE.]

March 11, 1884.

294,752.—Composite oil for lubricating, etc.—G. W. Banker.

Brief—Improvements on Letters Patent, No. 255,096, March 21, 1882.

Claim.—The herein described composite oil, composed of castor oil and corn oil in nearly equal proportions.

294,795.—Ore roasting furnace.—N. M. Langdon.

294,796.—Gas-producing furnace.—N. M. Langdon.

294,798.—Process of an apparatus for separating raw sugar liquor from the scum and mechanical impurities contained therein.—S. M. Lillie.

A process of separating a liquid from its mechanical impurities, specifically lighter and specifically heavier than itself, consisting in subjecting the impure liquid to the action of centrifugal force in a rapidly-revolving drum, and in drawing of from the revolving drum by itself the liquid separated from its mechanical impurities by the centrifugal force.

294,840.—Lubricating compound.—B. F. Bartlett.

Graphite, dairy salt, flour of sulphur and gypsum, mixed together.

294,862.—Hydrocarbon gas generator.—J. Flannery.

294,922.—Cold-air-blast centrifugal syrup cooler.—A. B. Smith.

Consists of a cooling pipe, upon the inner surface of which the syrup is spread by means of a revolving distributer and means for forcing or conducting air through the cooling tube.

294,940.—Process of extracting oils and fats from fish.—P. C. Vogellus.

Consists in subjecting the fish to the action of plaster of Paris, or some similar water-absorbing agent, whereby the water is removed therefrom, and then mingling the fish with a suitable solvent, whereby the oil in the fish is dissolved.

294,978.—Treating volatile and inflammable oils and fluids.—S. M. Eiseman.

Brief.—Improvements on Letters Patent, No. 282,970, August 14, 1883, to same inventor.

Claim 1.—As a new article of manufacture, a hardened mass, block or cake of granulated, thickened, partly solidified, or solidified, volatile and inflammable fluid or oil.

295,113.—Substance for rendering fabrics waterproof.—L. P. Converse.

Produces a pliable water-proofing compound, unaffected by variations of temperature, by boiling linseed oil at a temperature of from 620° to 700° Fahr, and combining it with copal varnish and a pigment.

295,118.—Gas apparatus.—A. O. Granger.

295,125.—Method of pulverizing, desulphurizing and otherwise treating metaliferous ores.—F. N. Luckenbach.

Subjects them to a current of highly super-heated, dry steam or other heated vapors or gases, or currents charged with materials for which the elements of such ores have affinities.

March 18, 1884.

295,184.—Process of extracting and melting tallow at a low temperature.—H. Lisagaray and H. Leplay.

Consists in first cutting the tallow or fat fine, and shredding it, then subjecting it to a pugging process without water, and under the influence of heat to about 68°-86° Fahr, then subjecting the pugged mass to a churning operation while mixed with water and steam, at a temperature of about 136° Fahr. and finally churning and straining it, whereby the mixture of water and fat is separated from the nitrogenous substance.

295,309.—Incrustation preventive.—F. Troxel.

Claim.—A preparation or compound for extracting lime from water, and removing scale from boilers; composed of concentrated lye, rosin, and alum.

295,321.—Composition for refractory pottery.—E. F. Zinns.

Alumina, silica, magnesia, potter's clay, and graphite.

295,342.—Concentration and evaporation of sirups.—A. P. Boon.

Consists in pumping or injecting heated air at high pressure, and in an extremely fine state of division into the same.

295,508.—Vat or kettle for reducing or treating animal or vegetable matter—T. Swanton.

Vat has a perforated bottom plate, a perforated partition having an open space between its walls, and perforated ends set to leave spaces between these ends and the ends of the vat case.

March 25*th*, 1884.

295,525.—Compound for waterproofing and preserving buildings.—B. de Nise.

Fossil wax, carnauba wax, refined paraffine oil, and carbolic acid, united by heat.

295,550.—Process of, and apparatus for, vaporizing hydrocarbon oils.—H. F. Hayden.

295,576.—Chemical car warmer.—C. Mitchell.

Not intelligible without the specification.

295,615.—Process of treating fibrous rubber waste for the recovery of the rubber or caoutchouc therefrom.—A. O. Bourn.

Improvement on the invention in Letters Patent No. 292891, February 5th, 1884.

Destroys the cotton fiber contained in such waste by subjecting it the action of nitric or muriatic acid, or both acids of sufficient strength.

295,633.—Removing oleine from linseed oil.—T. H. Gray.

Consists in maintaining the oil at a temp. of 110° Fahr., and in a state of agitation for about ten hours a day for nine to fourteen days; then mixing therewith, while hot and in a state of agitation, a saline solution, and finally drawing off the saline and oleine precipitate, and washing the purified oil with pure water until no further precipitate is obtained.

295,646.—Reverberatory ore furnace.—G. W. Jones.

For desulphurizing, chloridizing, and chlorinating. Not intelligible without the drawing.

295,653.—Coloring and bronzing leather.—L. Klopfer.

A number of recipes for preparing the leather before applying the coloring matter or metal.

295,815 and 295,816.—Process of extracting metals from ores or metallurgical products.—E. H. Russell.

Consists in subjecting the ore or product to the dissolving action of a hyposulphite solution, and then to the dissolving action of a solution containing the double salt of cupreous hyposulphite and sodium hyposulphite.

295,822.—Apparatus for manufacturing illuminating gas.—J. J. Shedlock.

Brief.—Coal is distilled, as usual, in heated retorts and the gas conducted to the hydraulic main. The tar condensed from such gas while passing through a condenser, is passed into the top of a vertical retort containing solid carbon, while superheated steam is supplied to the bottom of such retort and decomposed into hydrogen and carbonic oxide in contact with the heated carbon, and the hydrogen combines with the rich gas and vapor from the tar to form carbureted hydrogen. These gases are passed into the main and mixed with the coal gas. Steam is superheated by passage through a coil of refractory material located in the retort furnace.

295,825.—Manufacture of parachinanisol.—Z. H. Skraup.

Not intelligible without the specification.

295,832.—Process of, and apparatus for, manufacturing gas.—J. L. Stewart.

295,841.—Manufacture of sugar.—K. Trobach.

Process of first freeing the saccharine substances of their water by means of alcohol vapor, and then extracting the sugar from such substances by means of rectified alcohol.

295,865.—Manufacture of paper pulp.—D. O. Francke.

Method of manufacturing paper pulp at a single operation by subjecting wood or analogous vegetable matter in a divided state to gentle mechanical

agitation with acid sulphite at a temperature of about 300° Fahr. and a strength of 4° or 5° Beaumé.

295,876.—Antiseptic solution.—J. F. Kennedy.

Consists of water, alum, granulated sugar, saltpeter, and gum arabic.

295,881.—Waterproofing composition.—A. Mink.

Tallow, rosin, creosote, rape seed and ammonia.

295,882.—Composition for cleaning textile fabrics, wooden and metallic surfaces.—F. S. Monroe.

Water, aqua ammonia, white castile soap, borax and nitrate of potash.

295,886.—Process of purifying hyphosulphite solutions used in leaching ores.—E.H. Russell.

The process of restoring the solutions after they have been used, consisting in introducing into the solutions sulphuric acid to neutralize the impurities therein.

295,887.—Process of separating metals from ores and metallurgical products.—E. H. Russell.

The process of removing precious metals and lead from their ores or metallurgical products and separating them from each other, consisting in dissolving them both out of the ore or product with a hyposulphite solution, and then adding to the resulting solution a soluble carbonate to precipitate the lead.

295,890.—Purifying water.—W. Tweedale.

Adds a saturated solution of lime water to the water to be treated and which has previously been highly heated. It is then thouroughly agitated and allowed more or less time to settle whereupon carbonate of soda is added, and the heated mixture again agitated and allowed to settle.

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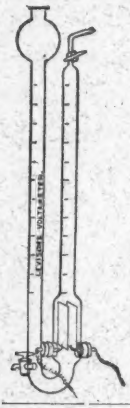

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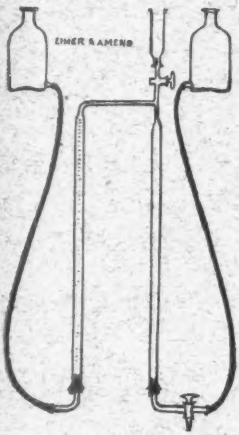

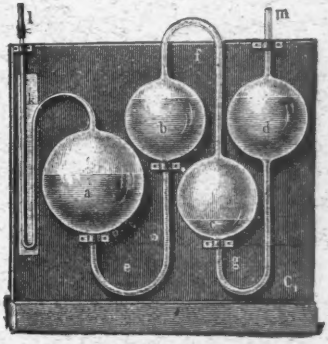

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